



ATAR course examination, 2019

Question/Answer booklet

FOOD SCIENCE AND TECHNOLOGY

Please place your student identification label in this box

WA student number: In figures

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In words

Time allowed for this paper

Reading time before commencing work: ten minutes

Working time: three hours

Materials required/recommended for this paper

To be provided by the supervisor

This Question/Answer booklet

Multiple-choice answer sheet

Number of additional
answer booklets used
(if applicable):

To be provided by the candidate

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: non-programmable calculators approved for use in this examination

Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised material. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of examination
Section One Multiple-choice	15	15	15	15	15
Section Two Short answer	8	8	95	68	55
Section Three Extended answer	3	2	70	40	30
Total					100

Instructions to candidates

1. The rules for the conduct of the Western Australian external examinations are detailed in the *Year 12 Information Handbook 2019*. Sitting this examination implies that you agree to abide by these rules.

2. Answer the questions according to the following instructions.

Section One: Answer all questions on the separate Multiple-choice answer sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. Do not use erasable or gel pens. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Sections Two and Three: Write your answers in this Question/Answer booklet.

3. You must be careful to confine your answers to the specific questions asked and to follow any instructions that are specific to a particular question.
4. Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Section One: Multiple-choice**15% (15 Marks)**

This section has **15** questions. Answer **all** questions on the separate Multiple-choice answer sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. Do not use erasable or gel pens. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/ tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Suggested working time: 15 minutes.

1. A critical control point in the Hazard Analysis Critical Control Point system is that at which loss of control may result in
 - (a) an unacceptable health risk.
 - (b) a loss of profit for the producer.
 - (c) the need for additional sanitation.
 - (d) poor quality assurance.

2. A food additive used to absorb moisture from the atmosphere and prevent food drying out is
 - (a) a humectant.
 - (b) an anti-caking agent.
 - (c) an emulsifier.
 - (d) a preservative.

3. Digestion of carbohydrates begins by the breaking down of food through
 - (a) segmentation.
 - (b) absorption.
 - (c) mastication.
 - (d) assimilation.

4. The *Australian Association of National Advertisers Code for Advertising and Marketing Communications to Children* is a
 - (a) mandatory code of conduct for advertisers.
 - (b) self-regulatory code of conduct for advertisers.
 - (c) legislated code of conduct for advertisers.
 - (d) code of conduct for advertisers set by the community.

5. An advantage of using high-pressure processing in food production is that it
 - (a) produces food that requires no refrigeration.
 - (b) can be used on almost any food product.
 - (c) is an inexpensive processing technique.
 - (d) extends shelf life without preservatives.

See next page

6. Recommended levels of the daily amounts of vitamins and minerals that the average healthy person needs to prevent deficiency are known as
- (a) Recommended Dietary Intake.
 - (b) Estimated Average Requirements.
 - (c) Adequate Intake.
 - (d) Nutrient Reference Values.
7. Jason is a vegetarian who has been advised that his diet is lacking in foods that may prevent osteoporosis. To reduce his risk of osteoporosis, Jason should eat more
- (a) eggs, tofu and spinach.
 - (b) broccoli, tofu and almonds.
 - (c) butter, eggs and broccoli.
 - (d) spinach, almonds and butter.
8. Glucose + yeast + moisture $\xrightarrow{\text{heat}}$ carbon dioxide + alcohol + energy is an equation representing the process of
- (a) aeration.
 - (b) creating a foam.
 - (c) fermentation.
 - (d) chemical raising.
9. A food packaging system that involves independently sterilising both the food and the packaging before sealing the food in a sterile container is
- (a) active packaging.
 - (b) aseptic packaging.
 - (c) intelligent packaging.
 - (d) barrier-specific packaging.
10. Environmental factors that can impact on the properties of baked custard include the
- (a) oven temperature and use of a water bath.
 - (b) temperature of ingredients and the kitchen temperature.
 - (c) use of a water bath and the temperature of ingredients.
 - (d) oven temperature and the kitchen temperature.
11. Two litres of full cream milk cost \$3.00. How much does $\frac{3}{4}$ cup of full cream milk cost?
- (a) 14 c
 - (b) 28 c
 - (c) \$1.12
 - (d) \$1.50

12. A food allergy occurs when the body's immune system responds to a
- (a) malabsorption of nutrients.
 - (b) dangerous antibody.
 - (c) chemical in processed food.
 - (d) specific food protein.
13. Phytoestrogens may reduce the incidence of
- (a) heart disease, constipation and eczema.
 - (b) some cancers, eczema and high cholesterol.
 - (c) heart disease, bone fractures and some cancers.
 - (d) bone fractures, high cholesterol and constipation.
14. In confectionery making, the key to successful crystallisation is cooling the syrup so that the
- (a) larger the crystals present, the coarser the texture.
 - (b) larger the crystals present, the finer the texture.
 - (c) smaller the crystals present, the finer the texture.
 - (d) smaller the crystals present, the coarser the texture.
15. The production of biofuels affects the global food supply by increasing the
- (a) land available for crop production.
 - (b) cost of fuel available for transporting produce.
 - (c) supply of grain available for food for humans.
 - (d) price of staple foods for global populations.

End of Section One

See next page

Section Two: Short answer**55% (68 Marks)**

This section has **eight** questions. Answer **all** questions. Write your answers in the spaces provided.

Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 95 minutes.

Question 16**(10 marks)**

- (a) Identify **two** types of carbohydrates and **two** types of lipids. (4 marks)

Carbohydrates

One: _____

Two: _____

Lipids

One: _____

Two: _____

- (b) Explain how dietary choices of carbohydrates and lipids can reduce the incidence of disease. (6 marks)

Carbohydrates: _____

Lipids: _____

See next page

Question 17

(8 marks)

Read the following recipe.

Quiche Lorraine

Ingredients	Method
<p>Pastry: 1½ cups plain flour 125 g butter 1 egg yolk 2 teaspoons lemon juice</p> <p>Filling: 1 onion, finely chopped 150 g bacon rashers, chopped 3 eggs 300 ml cream ½ cup milk 90 g grated cheese</p>	<ol style="list-style-type: none"> Sift flour then rub in butter. Add egg yolk and lemon juice to make ingredients come together. Knead gently on lightly-floured surface until smooth. Cover and refrigerate for 30 minutes. Grease a deep 23 cm flan tin. Roll pastry to line the tin. Lift pastry into flan tin; gently easing it into side of tin. Trim the edges neatly. Place flan on oven tray for easier handling. Bake blind at 200 °C for 10 minutes. Remove paper and blind baking beans, return to the oven and bake for a further 10 minutes at 180 °C. Cool. <ol style="list-style-type: none"> Cook onion and bacon together in a frying pan, drain fat. Spread into cooled pastry case. Beat eggs together and add remaining filling ingredients. Pour into pastry case. Bake at 180 °C for 35 minutes or until filling is set and brown. Stand quiche for 5 minutes before removing from tin.

- (a) State **one** adaptation that could be made to each of **two** ingredients in the recipe. Describe how each adaptation would improve the nutritional value of the quiche.

(6 marks)

Adaptation One: _____

Improved nutritional value: _____

Adaptation Two: _____

Improved nutritional value: _____

Question 17 (continued)

- (b) Describe **one** food processing technique used to control the performance of the ingredients in the quiche. (2 marks)

Question 18**(8 marks)**

Julie is an avid baker and wants to operate a cake business from her home. She has read her local council's website and knows that she will need to comply with the *Food Act 2008 (WA)* before being able to sell cakes to the public.

- (a) Describe the role of local authorities in implementing the *Food Act 2008 (WA)*. (2 marks)

- (b) Describe **three** provisions of the *Food Act 2008 (WA)* that Julie will have to comply with in order to operate her cake business. (6 marks)

One: _____

Two: _____

Three: _____

Question 19**(6 marks)**

Consumer interest in the relationship between the food we eat and health has grown in recent years. There is an increased demand for information about functional foods and how they may reduce the incidence of chronic disease and optimise health.

Read the following case study.

Madison is an active 19-year-old university student who has altered her diet to include functional foods to minimise her risk of disease and improve her health.

A typical daily food intake for Madison includes:

Breakfast	Instant porridge with honey, slivered almonds and nutmeg Cranberry juice
Mid-morning snack	Orange and poppy seed muffin White coffee with sweetener
Lunch	Chicken and cheese salad wrap with spinach leaves, quinoa, capsicum and carrot Water
Mid-afternoon snack	Apricot yoghurt White coffee with sweetener
Dinner	Pan-fried salmon, mashed potato and steamed asparagus

Select **two** functional foods from Madison's daily food intake. Identify the functional component in **each** and describe how **each** could be beneficial to her health.

One: _____

Functional component: _____

Health benefit: _____

Two: _____

Functional component: _____

Health benefit: _____

Question 20

(10 marks)

In 2017, diabetes was ranked seventh among the leading causes of death in Australia (4839). Diabetes is a chronic condition in which the hormone insulin, which is essential for the conversion of glucose into energy, is no longer produced, is not produced in sufficient amounts by the body or the body is unable to use it properly.

- (a) Describe **two** risk factors that may contribute to the development of diabetes. (4 marks)

One: _____

Two: _____

- (b) State **three** health complications of diabetes. (3 marks)

One: _____

Two: _____

Three: _____

- (c) Explain how the glycaemic index of food can be used to help regulate blood sugar levels. (3 marks)

Question 21**(8 marks)**

Adaptations to the commodities used in recipes and the technology used to manufacture food products enable the development of new products that meet the needs of consumers.

Describe how **two** adaptations to commodities and **two** adaptations to technologies are used to develop new food products.

Commodities

(4 marks)

One: _____

Two: _____

Technologies

(4 marks)

One: _____

Two: _____

Question 22

(10 marks)

Over the past decade, the incidence of lifestyle and diet-related diseases have surpassed that of infectious and transmissible diseases globally. While under-nutrition is commonly thought of as global food inequity, it is now understood that over-nutrition is equally prevalent. In 2014, the World Health Organisation estimated that more than 1.9 billion adults worldwide were overweight and more than 600 million adults were obese, while 42 million children under the age of five were overweight or obese.

- (a) Describe **three** reasons why global food inequity has led to an increase in the percentage of the population that suffers from over-nutrition. (6 marks)

One: _____

Two: _____

Three: _____

- (b) Describe **two** strategies that could be used to reduce the global incidence of over-nutrition. (4 marks)

One: _____

Two: _____

Question 23**(8 marks)**

A large soft drink producer in the Australian beverage market has found that its current product line has become stagnant as its competitors are out-performing it.

Identify **two** techniques that the soft drink producer could use to recapture market share. Justify why **each** would be an effective way of achieving the soft drink producer's objective.

One: _____

Two: _____

End of Section Two

See next page

Section Three: Extended answer**30% (40 Marks)**

This section contains **three** questions. Answer **two** questions only. Write your answers in the spaces provided following Question 26.

Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 70 minutes.

Question 24**(20 marks)**

There is an abundance of food products available to the consumer. Supermarket shelves are stacked to overflowing with local and overseas products. Why do we need more?

- (a) Describe **four** factors that influence the development of new food products. (8 marks)

The aim of food product developers is to make a profit. In order to do this the product must meet the needs of consumers. A range of approaches is used to analyse food products.

Read the following case study.

A company that produces fish products has developed a heat and serve, crumbed fillet of whiting with white sauce. The fish can be heated in an oven, with or without thawing. The sauce is heated in a sachet and poured over the fish. The meal could be served with oven baked chips and salad. The company has recently marketed the new product and has collected two types of data, shown below, which will be used to evaluate the product.

Data collection one: (5 = high score, 1= low score)

Characteristics	Taster A	Taster B	Taster C	Taster D
Flavour	3	4	3	3
Appearance	5	4	5	4
Crispness of crumb coating	2	3	2	2
Firmness of flesh	3	3	4	3

Data collection two: (20 responses)

Characteristics	Percentage of positive responses
Was the portion size appropriate?	80
Was the viscosity of the sauce suitable?	65
Was the nutrient content suitable?	70
Was the colour consistent?	80

- (b) For **each** of the tables shown above:
- identify how the data have been collected
 - describe the method used to collect the data
 - identify the type of data collected. (8 marks)
- (c) Use the data provided in the tables in part (b) to justify **two** recommendations for improving the food product. (4 marks)

See next page

Question 25**(20 marks)**

The genetic makeup of crops has been manipulated by scientists and food producers for decades. Recently, the genetic modification (GM) of food has become a major issue in the media due to the controversy about the production of GM crops and strong consumer feelings about their impact on health and the environment. However, there are a number of arguments in favour of the use of GM food in food production.

- (a) Describe the term 'genetic modification', as it applies to food production. Discuss **two** requirements of Food Standards Australia and New Zealand when genetically-modified crops are used in the production of foods for human consumption. (8 marks)
- (b) Describe **one** benefit of genetic modification for each of the following:
- yield
 - environmental conditions
 - commodity prices. (6 marks)
- (c) Explain **two** risks of the genetic modification of foods. (6 marks)

Question 26**(20 marks)**

Many factors combine to affect the health of individuals. Australians are living longer than ever before but half are living with at least one chronic condition. Chronic conditions are Australia's leading cause of ill-health and death but there are signs of positive behaviour changes, particularly among young Australians.

The lack of one or more micronutrients in the diet can be a cause of ill health or disease and some people use supplements on a regular basis.

- (a) Discuss **one** advantage and **one** disadvantage of the consumption of micronutrient supplements. (4 marks)

Genetic influences on health and wellbeing include gender, race and family history.

- (b) Select **two** genetic influences and demonstrate how **each** could impact on health and wellbeing. (4 marks)

A growing number of deaths from chronic disease in Australia are caused by poor lifestyle choices.

- (c) Describe how **three** lifestyle risk factors cause health issues. Recommend **one** strategy to reduce the risk to health and wellbeing for **each** factor. (12 marks)

End of questions

ACKNOWLEDGEMENTS

- Question 12** jajostage6foodtech. (n.d.). *Influences on nutritional status*. Retrieved May, 2019, from https://jajostage6foodtech.weebly.com/uploads/4/5/6/5/45657439/influences_on_nutritional_status_-_health_hereditiy_and_diet___1_.pdf
- Question 20** First paragraph adapted from: Australian Bureau of Statistics. (2018). *National Health Survey: First Results, 2017-2018*. Retrieved May, 2019, from <https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4364.0.55.001~2017-18~Main%20Features~Diabetes%20mellitus~50>
Used under a Creative Commons Attribution 4.0 International licence
- Question 22** Third sentence adapted from: World Health Organisation. (n.d.). *Nutrition: Double burden malnutrition*. Retrieved May, 2019, from <https://www.who.int/nutrition/double-burden-malnutrition/en/>

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